

AIR FORCE RESEARCH LABORATORY

Quarterly Report (1 Jan – 31 Mar 2004)

Air Force Office of Scientific Research (AFRL/AFOSR)

Federal Voting Assistance Program Values Computer Security Expertise

Maj Lorina Poland, an Information Systems Manager assigned to the Air Force Office of Scientific Research, is providing critical computer security expertise to the Secure Electronic Registration and Voting Experiment (SERVE), an on-line DoD voting system designed to provide greater access for over 6 million overseas military and civilian absentee voters. As a computer generalist, Maj Poland has provided invaluable assistance to the SERVE program director by ensuring that the system's programming is secure and complete, integrating the main DoD system with each state's voter registration and election systems, and providing oversight for the program's testing and documenting phases. Although this system will not be available for the 2004 elections, the thrust for now is to validate the concepts and provide Congress with a balanced picture of the advantages and challenges of future remote Internet voting systems. It is testimony indeed to the fine body of AFRL Reserve members that the Federal Voting Assistance Program chose Maj Poland from a large pool of applicants due to her expertise in web-based applications and program management experience. This is her second quarter performing a 179-day MPA tour with FVAP since November 2003.

Reservist Coordinates Key Phase of Second Multi-University Research Initiative

Captain Thomas E. Johnson, Bio-effects Program Officer, coordinated the review and selection of the best of 15 universities competing for a Multi-University Research Initiative (MURI) he co-authored (with Dr Walter Kozumbo, AFOSR/NL). The goal of this 5 year, \$5M program is to discover how nano-particles from radio-frequencies interact with living cells. This effort is a precursor to the development of non-lethal weapons and rapid wound healing. Additionally, Capt Johnson provided a review course in bio-effects and electro-medicine for active duty members interested in passing their specialty board exams. The course was attended by 10% of the active duty officers in the 43 Y career field.

Design of a Web-Based Training Template

Lt Col Andy Stricker, reserve project director for information technology, has designed a web-based training template to be used as a prototype for managing and delivering AFOSR training. The template includes administrative tools for managing students, tracking and reporting progress. The template uses "Flash" components for delivering interactive multimedia enriched instruction and assessment. Additional efforts were initiated to prototype a database-supported website to assist AFOSR reservists and supervisors in managing documentation and communication needs. This site would support the tracking of suspenses, reports, and shared documentation on the secure basis of pre-set access privilege. LtCol Stricker is coordinating fellow reservists in the design and development of this site, as well as working with members of the active duty unit

who are providing hosting support. A first-stage website has been constructed to support rapid prototyping of new functions and tool development.

Successful US Air Force – Taiwan Nanoscience Initiative Workshop

During an MPA tour in February 2004, Lt Col Anne Fay, Program Manager for the Taiwan – AFOSR Nanoscience Initiative with AFOSR/NE, led a very successful US Air Force – Taiwan Nanoscience Initiative Workshop in Maui, Hawaii. The goal of this workshop was to foster cooperative and mutually beneficial scientific interactions between researchers in Taiwan and scientists at AFRL. The Taiwan – AFOSR Nanoscience Initiative provides access to basic research into future weapon systems supporting our next generation of war-fighters.

Among her many responsibilities, LtCol Fay briefed status and schedule at the Initiative Forum, chaired one of the technical sessions and ensured that DoD people with like interests were introduced to each other. She also facilitated networking between AFRL and Taiwan researchers by leading side meetings with the Taiwanese and AFRL leads to discuss continued and expanded interactions on funding, workshops, and research.

Prior to the Workshop, Lt Col Fay collected over 35 two-page white papers submitted by Taiwanese researchers to compete in the next round of proposals to be funded by AFOSR in Taiwan. AFRL reviewers then had an opportunity, during the workshop, to interact with the authors of the white papers and to listen to presentations of their ongoing work. Lt Col Fay compiled the results of some 85 reviews and generated a list ranking the white papers in order of relevance and importance to AFRL. This list will serve as the basis for discussions with the leadership of the Taiwan Nanoscience Program concerning joint funding of the most significant weapon systems-related research.

According to Dr. Jack Agee, Director of AFOSR/NE and sponsor of the Taiwan Initiative, “The workshop was 140% successful.” Attending the Workshop were MGen Paul Nielsen, Commander, AFRL; Dr Lyle Schwartz, Director, AFOSR; and Dr Maw-Kuen Wu, Director, Institute of Physics, Academia Sinica and Executive Director, National Nanotechnology Program (Taiwan). In all, over 85 people attended the Workshop, including a delegation of about 30 from the Taiwanese research community.

Photos



Lt Col Anne M. Fay with Dr Maw-Kuen Wu, Director, Institute of Physics, Academia Sinica and Executive Director, National Nanotechnology Program (Taiwan)



Lt Col Anne M. Fay with Dr Yu-Ching Fang (left) and Dr Jiunn-Jye Luo of Chung Shan Institute of Science and Technology (CSIST) (CSIST is roughly equivalent to AFRL and ASC combined)



Attendees at the US Air Force – Taiwan Nanoscience Initiative Workshop in Maui, Hawaii, 19-20 February 2004

History is Written at AFOSR

LtCol Darren Rice, an IMA in AFOSR's Technical Communications Branch, wrote the majority of the unit's FY03 history document. This 50-page document will become part of the AFRL FY03 history report. During this quarter, LtCol Rice also created the first AFOSR IMA website, giving Unit IMAs and their supervisors efficient access to information, forms, and guidance for use in their administrative tasks and job functions. The website is currently hosted on the AFRL Corporate Intranet site.

Small Business Technology Transfer Program for Ionic Liquid Lubrication

Major Paul Mantz, a Reservist with AFOSR/NL, recognizing the potential for ionic lubricants in allowing DoD systems to operate in challenging environments, wrote a Small business Technology Transfer (STTR) proposal for developing these new materials and then fielded queries by potential small business applicants. These new ionic lubricants can be used for aircraft, spacecraft, and micro-electromechanical systems (MEMS), due to their compatibility with a wide variety of materials including: steel, aluminum, copper, silicon, silicon dioxide, silicon nitride, aluminum oxide, and Sialon ceramics. They are further attractive due to their non-flammability, low vapor pressure, broad liquid-phase temperature range, and high thermal stability.

AFOSR Space Experiment

Major Paul Mantz is also to be credited with gaining AFOSR sponsorship of a materials international space station experiment (MISSE). He met with AFOSR program managers from multiple directorates to grow grass root support for the experiment and interfaced with multiple experts to generate a set of proposed experiments. The resultant MISSE mission will provide critical insights into the governing mechanisms of material degradation in the space environment, and provide essential validation data for on-going computational efforts and terrestrial based Low Earth Orbit (LEO) exposure research. This is an exceptional opportunity for AFOSR to sponsor a series of fundamental experiments that will answer key chemistry and physics questions about the degradation of materials in the LEO space environment and lead the way for improved materials for satellites and space vehicles.

Lubrication for Extreme Environments University Research Initiative

Major Paul Mantz reviewed the technical content of 23 white papers and 6 full proposals to recommend funding for various Multi-disciplinary University Research Initiatives (MURI), two of which were awarded. These research initiatives entail development of new nano-composite coatings that will reduce coating friction, wear and other mechanical properties relative to traditional single-phase materials. The novel properties of nanocomposite coatings will revolutionize the design and application of numerous moving mechanical assemblies by enabling operation in the severe environments. These coatings will make possible a wide variety of DoD applications, including micro-electro mechanical systems (e.g., Radio Frequency and DC switches for phased array radar, communications, and satellites), space system control (e.g., gyros, high speed flywheels, pointing and tracking gimbals), and air vehicle propulsion (e.g., bearings, struts, and turbine blade – cam anti-fretting coatings). In short, the approved MURIs recommended

by Maj Mantz will lead to enhanced capabilities and reduced maintenance requirements for future AF systems.

Effects of Broadband Radio-frequency Pulses on Electronic Circuits and Systems

Major Christian O'Keefe, an AFOSR program manager, is leading an effort to evaluate and score proposals relative to a phase I Small business Technology Transfer (STTR) topic he researched and composed. Major O'Keefe organized the activity of several reviewers, including members from Navy, Army and Air Force Research Laboratory outside AFOSR. He addressed questions from potential submitters, updated the STTR question and answer website with relevant information, and began planning for the next annual review of a two-team multi-university research initiative on the "Effects of Broadband Radio-frequency Pulses on Electronic Circuits and Systems."

AFOSR JAG Office ask Reservist for Legal Opinion

Captain Alan Sutton, Assistant Staff Judge Advocate, Air Force Office of Scientific Research, provided critical guidance on problems involving two AFOSR programs: Windows on Science and Conference Support. Capt Sutton's advice on these programs rectifies previously erroneous information and possibly frees AFOSR from unnecessary restrictions.

Directed Energy Directorate (AFRL/DE)

Better! Faster! Cheaper!

Capt Doug Brann, has taken this mantra to heart. A resident of Australia who performs one month consecutive duty at Kirtland AFB each year, he recently worked on refining a computer code used at Starfire Optical Range and Maui Space Surveillance Site that allows rapid target selection during active tracking experiments on live-fire missiles. Before Capt Brann's involvement, the computer job run time was approx. 12 hours—now it is only 1 to 2 minutes: a 3-order-of-magnitude improvement in execution speed! During the coming summer's month-long tests, the improved code is estimated to save approximately \$700k of the \$5M experiment budget.

IMA Pinch Hits a Home Run

Because of LtCol David Barnaby's association with the Aether experiment over the course of some years, he was able to take charge and complete the experiment at Starfire Optical Range when an active-duty coworker went on medical leave. He was further able to complete the analyses in only 10 days—in time to present results at a critical program review. In addition, he discovered and was able to correct a problem that would have seriously skewed the results. As a result of LtCol Barnaby's presentation at the program review, the \$4.5M project has been approved for another year. In addition to breakneck data analysis, Lt Col Barnaby devoted time for humanitarian concerns, frequently visiting his coworker during his recuperation to boost morale and keep him informed of progress. The ailing active-duty member told Lt Col Barnaby he was one of the few scientists the member trusted to analyze the data prior to the critical program review.

Human Effectiveness Directorate (AFRL/HE)

Reservist Performs Duty as Chief Technology Officer

Col Bill Clapp, Air Force Research Laboratory, Human Effectiveness Directorate, is serving on active duty as Chief Technology Officer at the Human Effectiveness Directorate. He played a key role in the recent Team Patriot meeting at Salt Lake City, where for the first time in many years, AFRL re-established (thanks to the initiative of Col Clapp) an opportunity to inter-operate with Air and Army National Guard units from across America in field exercises to be held outside Salt Lake City in June. Col Clapp hand-picked a team of AFRL Reservists, organized and lead them in meetings with Guard leaders to pre-plan exercises and roles for the coming event. The opportunity Col Clapp created will allow AFRL to host and demonstrate emerging proto-type technologies, whereby to gain timely user feed-back on operational viability as well as possible funding support for continuing development. For a small investment of Reserve man-hours, the net gain is a marketing opportunity for AFRL to promote its technologies to a wide body of end-users, not to mention an opportunity for AFRL Reservists to gain first-hand knowledge of air and ground field operations where such technologies may and can be used.

Reservist Clarifies DOD Market for Rotary-Wing Displays

Lt Col Dan Desjardins, a Cat B IMA assigned to Air Force Research Laboratory, Human Effectiveness Directorate, Crew Systems Interface Division, authored a paper titled "Military Display Market Segment: Helicopters," regarding direct- and virtual image display devices found on Army, Air Force, Navy and Marine helicopters. The paper will be presented 14 April at the Defense, Security and Cockpit Displays XI conference in Orlando FL, sponsored by the International Society for Optical Engineering. The paper dissects the military market for military helicopter electronic displays in terms of technology, high and low information content, industrial base (custom vs. ruggedized vs. full Commercial Off-The-Shelf), and performance parameters, to include luminance, contrast ratio, resolution, gray levels, viewing angles, Night Vision Imaging System compatibility and environmental qualifications. Particular cockpit displays, both direct view and virtual image (head-mounted) are exemplified in detail, to cover various applications across Service and across as many as eleven mission categories, to include attack, observation, search and rescue, anti-submarine, cargo, utility, etc. The detailed exposition on the military display market for helicopters allows identification of existing commonality and where such commonality is feasible and desirable in future. Industry can use this information to make time critical decisions for future product investment to replace aging technologies relative to those segments of the DOD market against which they may wish to compete. The advantage for DOD is reduced costs relative this competition. By contrast, DOD program offices can identify where they may leverage similar display requirements rather than remain unique, thus capitalizing on large acquisitions and reduced cost per unit volume.

Reservist Supports Joint AFRL/Naval Research Laboratory (NRL) Duty Tour

Major Richard Friedman, an aerospace physiologist (USAF/SG) assigned to AFRL/HEPG, is participating in centrifuge training and testing of a new German-designed G-suit that does not rely on attachment to a compressed air source. As a result of a tour designed to increase AFRL's interaction with the Navy Research Laboratory (NRL), he is conducting studies of mechanisms underlying decompression-induced spinal cord injury in collaboration with the Operational and Undersea Medicine Division of the Naval Medical Research Center. These studies will help determine the usefulness of the decompression injury model for studying other spinal cord injuries. In recognition of Maj Friedman's inter-service expertise, he was invited to present a briefing at the Naval Submarine Base, Bangor, WA in conjunction with his participation in NRL's underwater acoustic signaling mission.

Reservist Assists in FY04 Division-level Budget Development

Major Terrell Scoggins (HQ AFRC/SG), an IMA Biomedical Science Corps Officer attached to the Biosciences and Protection Div (AFRL/HEP) at Brooks City-Base TX, provided valuable analytical support in documenting FY04 budgets for HEP programs. Maj Scoggins assisted Division leaders in compiling, coordinating and reviewing detailed program-level budget information for core HEP 6.1, 6.2, 6.3 and Congressional Add programs at the Armstrong Research Site. His attention to detail was critical in resolving several disconnects between Division and Directorate-level budget documentation. Maj Scoggins also coordinated HEP participation in the 311 HSW/YA-sponsored Aircrew Protection Industry Day held in San Antonio 27-28 Jan 2004. As a senior IMA at Armstrong, Maj Scoggins also leverages IMA talent from outside the lab. For example, he invited IMA Lt Col Chris Hallman, an aviation human factors expert assigned to HQ AFSOC/SE, to visit Brooks 13-16 Jan 2004. This collaboration between AFRL and HQ AFSOC is expected to yield important dividends, to include increased understanding of Special Operations fatigue issues, accelerated transition of AFRL fatigue management technologies to AFSOC, and increased opportunities for aviation fatigue management technology transfer between AFRL and at least one major commercial airline.

Reservist Supports AFRL/HE Technical Directorate Reserve Program

Lt Col Ken Wodke is the HE Senior IMA, with responsibility for managing HE's Reserve program, comprised of 16 reservists. Aside from supervising HE reservists and mentoring junior reserve officers, LtCol Wodke issued a veritable barrage of timely and important messages from AFRL/CVM and upper management, including fitness questionnaires and fitness training policy, Ohio State tax issues, biography queries for future conferences, notices regarding officer training (e.g., Joint Force Employment, Military Ops Other Than War, etc.), extension of CONUS Space A travel, etc. Not only this, but LtCol Wodke collected input from each of his 16 Reservists for the HE quarterly report, which he then drafted for submittal to AFRL. This report is critical in allowing AFRL to understand and monitor how directorate Reservists contribute their expertise and talents, and relate these to AFMC and HQ ARPC for management and funding purposes. As communication is the life-blood of any operation, LtCol Wodke's efforts have been vital to sustaining the HE and AFRL Reserve program. In addition to these normal duties, Ken supported an Off-Site meeting at Albuquerque, NM. He worked with

Col Bill Clapp and Lt Col Dan Desjardins to prepare for a planning meeting in March for Team Patriot (Army Guard and ANG exercise) to be conducted in June.

Reserve Flight Surgeon Supports Crew Protection Research

LtCol Paul Youngstrom (HQ AFRC/SG IMA Flight Surgeon), is attached to the Bio-dynamics and Protection Division (AFRL/HEP) at Brooks AFB, Texas. While on assignment to HEP, he provided essential medical support for research to improve mission-critical aircrew performance in stressful environments. LtCol Youngstrom's work entailed: (1) medical observation and evaluation of centrifuge subjects wearing the COMBAT EDGE anti-G suit. The purpose of the observation was to assess the protective advantage conferred by individually tailoring the breathing and anti-G suit inflation pressures according to subject size, and to evaluate the utility of pressurized arm sleeves and gloves for relieving G-induced arm pain and for overall G-protection, (2) medical observation and evaluation of hypobaric chamber subjects to determine the effects of low-grade hypoxia on cognitive function and night vision using night vision goggles, an issue of special importance for operations conducted in unpressurized aircraft, (3) medical observation and evaluation of centrifuge subjects in support of developing a prototype Smart Aircrew Integrated Life Support System (SAILSS). SAILSS seeks to optimize +Gz tolerance by sensing pilot biophysical data and adaptively adjusting life support equipment, (4) medical consultation on fatigue countermeasures research investigating rapid reversal of cognitive performance degradation due to sleep inertia after sudden awakening from crew rest induced by "No-Go" medications, (5) medical supervision of AETC and foreign flight surgeon centrifuge training, (6) medical observation and evaluation of centrifuge subjects during early developmental testing of a novel, unpressurized G-suit, (7) medical consultation regarding the safe use and design of a combined noise-abatement/communication ear plug in the F-22, and (8) medical evaluation of aircrew during centrifuge qualification. Both in medical supervision of novel anti-g equipment and ear plug use and the more routine medical supervision of centrifuge or hypobaric subjects in test or qualification, LtCol Youngstrom's efforts on behalf of the Bio-dynamics and Protection Division is helping to bring on board new and better equipment for aircrew use and train those aircrews to be better, safer and more effective pilots, co-pilots and navigators.

Information Directorate (AFRL/IF)

IMA Develops Warfighter Workstation and Assists BRAC

LtCol Robert "Jake" Carter continued development of the Simplified AWAC Workstation (SAW) tool. Final drafts of the interface control document and software are nearing completion. The SAW tool will be a valuable addition to command and control battlespace presentations for future development of command authority wall displays. Commanders can practice simulated real-time decision making using preprogrammed scenarios or use the system in real-time war application. This is a plus to the warfighter! Additionally, LtCol Carter traveled to Washington D.C. in March to support the Base Realignment and Closure (BRAC) 2005, providing input to the Technical Joint Cross Service Group, which is addressing how mapping and analysis of a current data call can

best be handled. He will be representing Col Paula Loomis, Pentagon BRAC, at the next meeting.

IMA Updates Distributed Collaboration and Decision Document

Major Angela Crawford updated the Distributed Collaboration and Decision Support Document, (DCDSD) a summary of over 180 commercially available information technology tools, conferences and references covering categories such as knowledge management, groupware, simulations, workflow and business management. Maj Crawford also created a technology guide and cross reference to go along with the document. The DCDSD and technology guide will be used in planning and to support yearly discussions with the Scientific Advisory Board on the Collaborative Decision Support Environment project.

IMA Provides Operational Assessment of Advanced Antenna Designs

Maj Eric Butter conducted preliminary project planning during IDT periods at Rome. The "deliverables" that were produced consisted of a MicroSoft PowerPoint briefing, which was well received by IFE. To improve his knowledge of interoperability issues, Maj Butter attended the Phoenix Challenge 04 conference hosted by NRO, where he received briefings from USAF, US Army, USN, USSOCOM, STRATCOM, as well as from allied organizations from UK and Australia. During a split tour with the antenna technology area (SNHA) at Hanscom, Maj Butter provided the branch chief with an operational assessment of various lab technologies to include: the Micro Electro-Mechanical System-based JLENS antenna, multi-spectral camera imaging/sensing, and advanced antenna designs. Maj Butter supported AFRL/SNH by reviewing and recommending SN technologies for demonstration at the Team Patriot exercise to be held at Fort Drum in June 04 and provided an operational perspective on the utility of SN technologies in support of the warfighter.

IMA Outlines Book on Wargaming

Col Matt Caffrey, Sr IMA for AFRL/IF, continued development of a book on wargaming. As new joint doctrine and in draft Air Force Doctrine calls for the use of wargaming in all deliberate and crisis action planning, it is important that the Information Directorate and the Air Force in general gain a better appreciation of the capabilities and limitations, as well as opportunities to increase the positive impact of wargaming. Col Caffrey completed the outline, introduction (with inserts), research, and a chapter on wargaming history. Col Caffrey has also written a related paper to be presented at the International Society of Optical Engineering in May 04. He delivered two lectures to students at Air Command and Staff College: one in conjunction with LtCol Phil Parker, US Army, on joint wargaming during the deliberate planning process, and a second on the advantages, pitfalls, best practices, and future potential of wargaming.

Munitions Directorate (AFRL/MN)

Briefing to ASC Mobility Assistant

Capt Ben Addison briefed MGen Metcalf on the Scientist Engineer Immersion Program, as part of the latter's visit to the AAC Reserve program and the Air Armament Summit hosted by AFRL/MN. A matter of particular pride was the fact the Scientist Engineer

Immersion Program was created by MN Reservists. MGen Metcalf was impressed with both the program and Capt Addison's briefing, commenting he did "a super job."

Negotiation with 46th Test Wing Saves Time and Money

Maj Russ Howard authored a Memorandum of Agreement between the Munitions Directorate and the US Army Corp of Engineers' Engineer Research and Development Center. He also participated in a site survey to determine the best location on the range at Eglin AFB for cooperative testing by AFRL and Army. Furthermore, Major Howard efficiently and expertly negotiated an agreement with Eglin's 46th Test Wing for long term use of the above-mentioned test site. Maj Howard's negotiating skills are credited with saving six months over a normal coordination process, an economy of both time and money.

Small Business Innovative Research (SBIR) Proposal Review

Maj Don Lorey served as an evaluator for the SBIR Phase 1 proposal review cycle. He reviewed three proposals investigating novel approaches for linear material processing and seven proposals investigating methods to calculate height of burst altitude utilizing passive sensors. Maj Lorey's recommendations will serve as a basis for possible MN funding of small business research on said topics, areas of importance in terms of efficient manufacture and novel technology ultimately serving the warfighter.

Small Business Innovative Research (SBIR) Proposal Review, Revisited

Maj James Savage also served as an evaluator for the SBIR Phase 1 proposal review cycle. Maj Savage evaluated five proposals for innovative approaches, development and use of micro air vehicles. These vehicles are envisioned as one of several possible solutions for defeating deeply buried targets. Maj Savage's evaluations are key to MN in deciding whether any of the small business applicants for development of micro air vehicles offer a technically viable and cost-effective approach.

Operation Iraqi Freedom and AFMC/CC Focus Group

Maj Savage, as the MN Reserve point of contact for AFRL's Crisis Action Team, supported one real-world tasking this past quarter in support of Operation Iraqi Freedom. He also served as liaison between Munitions Directorate and AFMC, representing MN at the Air Force Material Command commander's focus group meeting.

Scientist Engineer Immersion Program

As part of the Scientist Engineer Immersion Program, Capt Joe Price organized and helped oversee a class sponsored by the Munitions Directorate for outside organizations, to include tours and demonstrations of the High Explosive Research and Development facility and the Advanced Weapons Effects Facility. This class allowed scientists and engineers who were not munitions experts to better understand and appreciate the work done by their colleagues in MN.

Scientist Engineer Immersion Program, Revisited

LtCol Mark Koch supervised a Scientist Engineer Immersion Program (SEIP) class, entailing weapons loading, mission briefs, and simulator exercises. He authored

Memorandums of Agreement that forged long-term relationships between the 33rd Fighter Wing, the 53rd Wing, and the Munitions Directorate in order to support the program. Mindful of the need for continuity, he skillfully transitioned the day-to-day operations to an active duty focal point.

Operational Risk Management and Unit Compliance Inspection

LtCol Koch developed lectures tailored for Munitions Directorate supervisors and served as instructor teaching the leadership course he designed on Operational Risk Management. LtCol Koch also worked with members of the Unit Compliance Inspection (UCI) After Action team to come up with procedures to answer UCI findings and institutionalize new procedures. His effort in this regard will make the UCI process more efficient in future.

New Reservist Evaluates Software for Optics and Target Identification

Maj James Duffany, who recently arrived from the inactive Reserve, hit the ground running with tasking to support Dr Dennis Goldstein in evaluating software for use in basic research for optics and target identification. As software is typically 90% of the cost of any program activity, Maj Duffany's support to Dr. Goldstein and AFRL/MN is expected to yield great dividends!

Plans and Programs Directorate (AFRL/XP)

Reservist Supports Joint DARPA/USAF Space Study

Major Linda Fry, AFRL/XPS, Space and Missile Product Sector, Wright-Patterson AFB, OH, participated in a Responsive Space Study Workshop with DARPA, AFSPC, AFOSR, AFRL/PR, VA, VS, ML, XP & SMC to build an executable Science & Technology and Acquisition Plan to deliver responsive space capabilities to the user. Additionally, she helped coordinate the Tactical Satellite Plan for presentation to SECAF/U(Space), including planned approach, strategy and roadmap. Lastly, she authored and coordinated a point paper for SAF/U(Space) comparing the technological advantages and mission capabilities of the Russian RD-180 rocket engine versus the NASA RS-84 rocket engine prototype currently in development as part of their Next Generation Launch Technology program. This point paper will serve as a basis for independent evaluation of program scope, objectives, mission and technology need to achieve and maintain the U.S. industrial base for developing and manufacturing large rocket engines.

TECH CONNECT Reservists Conduct AFRL War Time Mission

A small team of reservists took responsibility and "ran the show" for the TECH CONNECT office (AFRL/XPTC), 29 March – 2 April 04, while full-time staff was TDY, on leave, or focused on other activities. The team was led by Lt Col Bob Orozco and supported by Majors Ges Seger and Gerard Simon. During the 7-day operation, the reservists answered customers' technology transfer requests, responded to a classified real world crisis action team request, and helped develop improvements to the TECH CONNECT website. The website enhancements will consist of a "self-help" feature to allow customers access to some of the most common answers they seek from TECH

CONNECT. This, in turn, will allow the full time analysts to more fully research customer technology requests. TECH CONNECT, the only wartime mission defined by AFRL operating instructions, could not be accomplished except for the support provided by local AFRL IMA reservists.

TECH CONNECT Support to AF/IA

Lt Col Bob Orozco (AFRL/XPTT), expeditiously responded to a time critical request from the United Arab Emirates F-16 Block 60 Executive Independent Review Team (EIRT). The EIRT was tasked by AF/IA, the Air Force Director for International Programs, to provide a list of test facilities and contractors capable of conducting Mil-Std-810 environmental testing for the F-16 Block 60 program. Lt Col Orozco provided the EIRT chairman with a comprehensive list of sites and vendors within 2 hours of the initial request.

Joint Air Force and Navy ST&E Reserve Projects Initiative

Major Larry Huntley, IMA assigned to AFRL/XPS, continued his “very successful” work building joint areas of collaboration between Navy Science & Technology (S&T) reservists and AFRL. Working with Capts Dave Guza (USNR) and Anna Waggener, Major Huntley facilitated opportunities for Navy S&T reservists to work on Air Force hosted joint programs. During the second quarter of FY04, 10 Navy reservists were in various stages of participation on 10 AFRL programs: Joint Battlespace Infosphere (JBI) Program (sponsored by AFRL/IF, supported by Ron Sticinski, USNR), Study of Polymer Films for Photonics (AFRL/ML, supported by Jay Stockley, PhD, Lieutenant, USNR), Assessment of Biosensors/Bioelectronics for AF/Navy Applications (AFRL/ML, supported by Kathleen Mandell, PhD, Ensign USNR), Software Protection Initiative SBIR Evaluation (AFRL/SN, supported by Dan O’Brien, Lt Commander, USNR), Optical RF Combined Link Experiment (AFRL/SN, supported John Muth, PhD, Commander, USNR), Identification of Aerospace Vehicle Technology Needs program (AFRL/VA, supported Mike Brands, Captain, USNR), Space Vehicles Planning Support (AFRL/VS, supported by Caryn Barry, PhD, Captain, USNR), Autonomous On-Orbit Servicing (AFRL/VS, supported by Gurpartap “GP” Sandhoo, Lt Commander, USNR), Communication/Navigation Outage Forecasting System (AFRL/VS, supported by Michael Joyce, Commander, USNR), Space S&T Planning Support (AFRL/XPS, supported by Cathy Mule, Commander, USNR), and the Senior Navy Reserve Liaisons to AFRL/XP, (supported by Navy Reserve Captains Dave Guza and Anna Waggener, PhD). There are additional AFRL projects pending for next quarter, including new joint projects from AFRL/HE and AFRL/ML, that Major Huntley is seeking to facilitate in conjunction with Navy. As a final note, LtCol Joe Fraundorfer has coordinated on possible AFRL S&T reservists supporting Navy sponsored joint projects.

AFIT Laboratory Acquisition Management Course

Capt Brian H. Dietterick, AFRL/FM, Wright-Patterson AFB, recently taught the AFRL Business Management Highlights portion of the AFIT LAB-101 Laboratory Acquisition Management Course (LAMC) to over 75 AFRL scientists, engineers and program managers at Wright-Patterson, Edwards and Brooks AFBs. The course objective is for students to comprehend the role of AFRL in planning and executing the financial aspects of the Air Force's Research and Development Program. Capt Dietterick instructed

students on identifying AFRL funds, understanding the Planning, Programming, Budgeting and Execution System (PPBE), describing the AFRL budget execution process and understanding the AFRL financial resource law. The learning objectives he achieved included identifying the relationship between AFRL and SAF/AQR in developing the lab's funding requests, identifying how Air Force RDT&E is funded in AFRL, identifying the seven categories of Air Force research and development funds, defining and identifying financial funding transactions, describing incremental funding and identifying the legal limitations of appropriations. Capt Dietterick will present a "road show" version of the course at Kirtland AFB and Hanscom AFB in the next quarter.

AFRL IMAs Attend US Navy Retirement Ceremony

LtCol Joe Fraundorfer (AFOSR) and Maj Larry Huntley (AFRL/XPS) were invited to participate in the retirement ceremony for Program 38 (S&T) Director, Capt Kurt Hess, chaired by Rear Admiral Jay Cohen, Chief of Naval Research. Following the ceremony, LtCol Fraundorfer and Maj Huntly met with RADM Cohen and Dr Stephen Lubbard, (Tech Director, Office of Naval Research), who expressed gratitude in having Air Force participation in Program 38 activities, including the given ceremony. RADM Cohen and Dr. Lubbard both look forward to increased future opportunities of technical collaboration between the two services.

Space Science & Technology Summit

Major Larry Huntley (AFRL/XPS) assisted Colonel Jack Blackhurst, Space Sector Chief, AFRL/XPS, in organizing and coordinating the upcoming Joint Space Science & Technology Summit that will take place at the Office of Naval Research in June 2004. This summit is of great importance to AFRL as it will present Space Science & Technology programs of Air Force and Navy interest and help map mutual service strategies. The summit will be chaired by Rear Admiral Jay Cohen and MGen Paul Nielsen.

Propulsion Directorate (AFRL/PR-East)

Successful AFOSR Review & New PhD Program

Major Paul N. Barnes of the Propulsion Directorate's Aerospace Office organized a major review of basic research regarding super-conducting coatings for the Air Force Office of Scientific Research. The review was held 19-21 January 2004 at St. Petersburg, FL, with 47 speakers including several international speakers addressing research activities having an average funding level of \$3.5M apiece. These development activities are successfully transitioning to industry, where several multi-meter conductors are already being manufactured. Success in this area ensures availability of conductors for compact high power generators critical to multi-megawatt airborne applications, e.g., directed energy weapons. Major Barnes is currently developing recommendations for an AFRL PhD program to increase the laboratory's number of PhD level scientists and engineers. These recommendations will be based on a critical review of the Palace Knight Program previously established to accomplish this. As a matter of assisting PR in an administrative capacity, Major Barnes served on the board for selection of the directorate's company grade officer of the quarter.

SBIR Proposals Reviewed and Evaluated

Major Vince Winstead has participated in review and evaluation of multiple proposals for Small Business Innovative Research contracts with Propulsion Directorate's Energy Storage and Thermal Sciences Branch. The proposals under review entailed Fuel Cell Power Systems design and Nanomaterial-Based Lithium Ion Batteries – areas of vital interest to PR. Over the course of four days, Major Winstead succeeded in completing over 15 evaluations, lending critical support to the review activities of multiple staff members in the Energy Storage and Thermal Sciences Branch.

Reliable Detection of DC Arc Faults

Major Russ Spyker continued work characterizing DC arc faults relating to an experiment he constructed last year. Realizing the difficulties in using a Fourier spectrum for differentiating an arc signature from the DC load current, Major Spyker ingeniously utilized a technique of remote detection, analyzing the electric field about the arc. He postulated that energy coupled into a nearby antenna, serving as an inductor, will resonate with the input capacitance of an oscilloscope at a characteristic frequency. Proper characterization DC arc faults is a first step in determining how to prevent them, with consequent benefit to USAF systems. The new detection technique devised by Maj Spyker offers great promise and he has already begun exploring this technique with his team.

Analytical Research of Fuel Contaminants

Major Randy Kruger coordinated the Fuels Branch investigation exploring the extent of microbial contamination in aviation fuel. In doing so, he initiated and completed a fuel sample evaluation using the GF-FAME analytical system to identify microorganism contamination in Air Force fuel samples. Major Kruger wrote up and delivered a detailed presentation describing the background to this research and its goals. He also reviewed and identified technical literature that reported and described analytical methods used to identify microbial contamination. From this he authored a draft scientific paper that he intends to revise into a technical report. Maj Kruger's efforts to properly identify microbial contamination in aviation fuel will ultimately serve to eliminate it.

New Management Tools for Fuel Projects

LtCol Chris Belanger applied a previously developed management tracking tool to a new start the Fuels Branch is undertaking with the Defense Energy Supply Center. The Branch has proposed taking a critical look at fuel additives and fuel specifications with the goal of developing a strategy for AF aircraft to begin using Jet A instead of JP-8. LtCol Belanger created tools for the technical leads to use in managing the four projects related to this goal. These tools were completed and forwarded to the technical leads at the end of his annual tour. Follow-on work will include linking them together so that branch leadership can integrate efforts where possible.

Best Practices Implemented for Risk Mitigation

Captain Cameron Cunningham has begun development of a system of Best Practices for turbine engine research that will enable project managers to determine key areas of concern for successful demonstrations. It is currently estimated that engine technology

testing is delayed an average of six months due to government and/or contractor oversights between the Detailed Design Review and actual testing. Capt Cunningham's goal is to eliminate most of this delay by including in his Best Practices document checklists for risk assessment, engineering drawings, fabrication, and test preparation, along with risk mitigation techniques. Many of the critical items were derived from the DOD and NASA contractor lessons learned database that Captain Cameron previously implemented. The Best Practices system will be utilized by Air Force, Army, Navy and NASA for the Versatile Affordable Advanced Turbine Engine program and any propulsion demonstration intended to enhance the capabilities of the F-22, Global Hawk, and F-35 Joint Strike Fighter.

Space Vehicles Directorate (AFRL/VS)

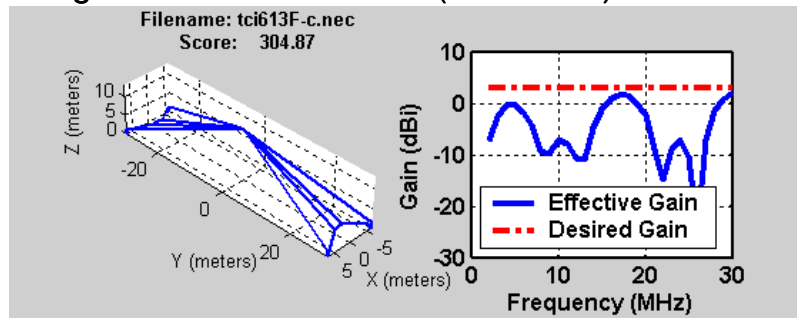
First Genetic DISS Antenna Constructed and Tested at Ascension Island

LtCol Teresa O'Donnell, an IMA assigned to the AFRL Det-3 Commander, Hanscom AFB, completed an optimized design of a hybrid Digital Ionosphere Sounding System (DISS) transmit antenna for the Space Weather Center of Excellence, AFRL/VSBXI. This new design represents a low-cost method for upgrading the existing DISS transmit antennas for higher effective gain and better ionospheric measurements. A team from VSBXI, led by Lt Richard Barton, built

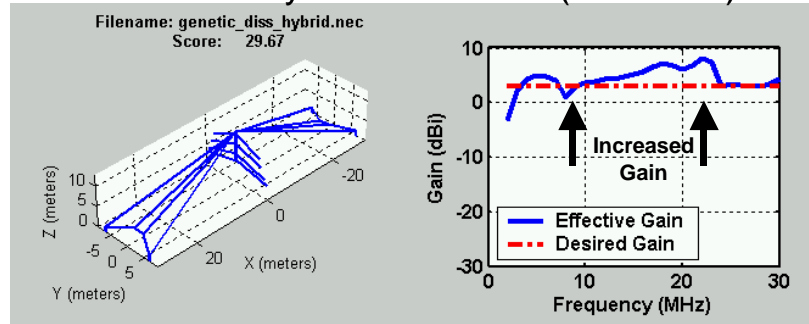
LtCol O'Donnell's genetic antenna design at Ascension Island in March, followed by three weeks of ionospheric measurements and testing. Initial measurements confirm that the genetic hybrid design performs up to 10dB better than the original antenna design, representing an increased efficiency of nearly 1000-fold! The upgrade was accomplished at minimal cost: four additional radiating wires added to the existing antenna system, and required approximately 10 man-hours by the two-person AFRL team.

There are currently 14 DISS transmit antennas operated world-wide by the Air Force Weather Agency (AFWA) and AFRL that could potentially benefit from this low-cost upgrade. This work, sponsored by AFOSR and carried out as a Space Vehicles Reserve

Original DISS Tx Antenna (Simulated)



Genetic DISS Hybrid Tx Antenna (Simulated)



project, represents a unique transition of genetic antenna 6.1 research into an operational Air Force asset!

LtCol O'Donnell and her team have authored a paper describing the genetic DISS hybrid antenna for presentation at the 2004 IEEE Antennas and Propagation Society International Symposium (June 2004, Monterey, CA), and have also submitted an abstract for a poster paper relative the 2004 Genetic and Evolutionary Computation Conference workshop on Military and Security Applications of Genetic and Evolutionary Computation (June, Seattle, WA).

E-Beam Vacuum Chamber Enhancements Completed

Major Paul Pelletier, assigned to the Space Technology Branch of the Air Force Research Laboratory, Kirtland AFB, designed and built an electron-beam 12 stop multi-attenuation shield. This device will be use in conjunction with a Dynamitron (1 MeV, 1 mAmp) electron-beam source to test electron deposition on electronic components. Maj Pelletier also designed and manufactured a set of vacuum adaptor flanges for the electron-beam chamber. Recognizing the need for guidance on proper use of the electron-beam vacuum chamber system, he authored a mission statement providing a technological blueprint with directions for use.

Reservist Contributes to Winning AFMC Heritage Award

In early 2004, the AFRL Phillips Research Site Historical Information Office (AFRL/VSIH) was selected as the winner of the 2003 AFMC Excellence in Heritage Projects Award, and has been further nominated for the 2003 Air Force Heritage Award. Both the AFMC award and AF nomination were due in no small measure to IMA Maj Rhonda Toba, who contributed to the team's achievement by researching and editing video clips of historical laser shootdowns for VSIH's briefing, Directed Energy: The Wave of the Future, presented at the Air Force's Centennial of Flight symposiums in Washington, DC and Los Angeles CA (fall, 2003). To improve VSIH's chances for future awards, Maj Toba also wrote an 82-page user-friendly instruction manual for creating interactive, multimedia history products.

Road Runner Requirements Submitted For Design Review

Major Steve Lindsay, a Space Systems Integration Team Lead assigned to the Simulation and Technology Assessment branch (VSES), completed an identification of requirements and collection of associated documentation for the Road Runner flight and ground experiment. Maj Lindsay began by refining the major ground system requirements, then articulated them into manageable sub-requirements to meet a February deadline for design review. He followed by researching potential Commercial-Off-The-Shelf approaches for forwarding data from the Common Data Link mobile ground terminal to the image processing workstations. Maj Lindsay identified several candidate vendors and determined the specific interfaces needing further definition in order to determine which vendors meet VSES's needs. He also updated the Road Runner Ground Interface Control Document by integrating information from several subcontractors, and added cross-references to all figures and tables to improve maintainability.

Marrying Spacecraft Test With Operations

Major Chuck Finley wrote a paper highlighting the merits and drawbacks of combining elements of test and operations relative to low-budget spacecraft acquisitions. The innovative approach could save millions of dollars and result in a more mature product to support readiness and on-orbit operations. Maj Finley will present his paper during the Low Cost Ground Operations session of the AIAA Space 2004 Conference in San Diego.

Thermovac Chamber Development Continues

Major Chuck Finley developed a refined schedule for integration and test of the new thermovac chamber at Kirtland AFB that more accurately represents a path to validation and allows for easier scheduling of future facility users. Major Finley's new schedule is a vast improvement over what had been proposed and is a direct result of his personal expertise and historical testing experience.

Small Business/Inovative Research (SBIR) program concepts developed for MDA

LtCol Ira Cooke, AFRL/VSSV, assisted the Technology Transfer Manager in collecting, prioritizing, and coordinating inputs for approximately 50 SBIRs. The branch will submit the SBIRs to the Missile Defense Agency next quarter for funding consideration.

Front-range Initiative Supports Space Experiments

Capt Steven Hart worked with Air Force Academy instructors to assist in the transition of flight hardware from the academic arena to flight integration and test at the Aerospace Engineering Facility at Kirtland AFB. Captain Hart is leveraging his experience with satellite integration and test to assist in development of plans for the FalconSAT hardware. In addition to supporting FalconSAT hardware integration and test, Captain Hart is developing a software command terminal for the US Air Force Academy EyasSAT satellite trainer. The command terminal will be used as a teaching aid for cadets at the Academy as well as senior Air Force leadership newly assigned to the Space Operations career field.

Helping Air Force Academy Prepare for FalconSat

Major Tammy Baker is working with Air Force Academy instructors and cadets, mentoring them in space operations issues as they begin development of on-orbit test plans for FalconSat. She participated in the training for FalconSat II operations, reviewed the Operations Plan and, based on her extensive experience and insight, rewrote the plan top to bottom. She was also a key member of the Operations Procedure Development Team, writing procedures for operating FalconSat II in the normal operations phase. Her civilian mission operations expertise as well as her Reserve experience are proving to be invaluable to the AFA cadets and instructor staff, teaching them many 'lessons-learned' that will help their space experiment go smoothly.

Academic Outreach Program Finds New Partner

LtCol Ira Cooke presented the AFRL/VSSV Overview Briefing to the New Mexico State University (NMSU) graduate student seminar. LtCol Cooke was a last minute stand-in for the branch active-duty representative, proving Reservists are ready, willing and able to not only augment, but replace the regular forces when needed. Given the seminar

serves as a recruiting tool for engineers coming into the Directorate Space Scholar program, LtCol Cooke's timely support ensured an uninterrupted conduit for VS scholars of the future.

Reservist Plays Key Role in Flight Experiment Division Restructuring

Led by Col (S) Norm Anderson, the senior IMA and VSE Chief Engineer, the division is making revolutionary changes in the way systems engineering support is provided across the six active flight experiment programs. Driven by a directorate focus on supporting the responsive space initiative – which requires the directorate to at least double the rate of space flight experiments - Col Anderson is defining ways of using existing resources and talents more efficiently and effectively. His long-term project achieved several major milestones this quarter, including the institution of two new program support functions. It also saw the beginning of the 'Front Range Initiative,' an outreach program aimed at universities along the eastern slope of the Rockies. Col Anderson also initiated a series of best-practices guidelines, initially focusing on Research & Development program risk management issues.

Administrative Support to the Active Duty Component

LtCol Ira Cooke, AFRL/VSSV, wrote the nominations for nine branch personnel relative to VSSV competition for the AFMC Engineering, Technical and Management awards and VS directorate awards. LtCol Cooke also provided training to a VSSV active duty captain, who will now serve as POC for the maintenance of the Lab Tour Guide.

ESC Mobilization Assistant Tours AFRL Hanscom Research Site

LtCol Teresa O'Donnell, IMA to the AFRL Det-3 Commander and Senior Site Reservist at AFRL Hanscom Research Site, invited Col Philip Meter, the mobilization assistant to the ESC Commander, for a laboratory tour of AFRL Hanscom Research Site. Col Meter and several of his guests, including Col Francis Harkins, IMA to the Deputy Commander for Acquisition, Col Ken Hasagawa, Director, ESC Foreign Military Affairs, Col Seth Davis, Senior IMA to the Director, ISR Integration SPO and Ms. Ruth Liebowitz, ESC Historian, toured both AFRL divisions at Hanscom in March. Col Meter and his party heard briefings on Infra-Red Tracking Satellite System and Global Positioning System and toured the Plasma Chemistry Lab in the Battlespace Environment Division (VSB). They also visited the Infrared Sensor, Optoelectronic, Antenna, and Electromagnetic Scattering Technology branches in the Electromagnetic Technology Division (SNH). Following the tour, Cols Meter, Harkins, and Davis had lunch with LtCol O'Donnell and several of the AFRL Hanscom IMAs. This opportunity for interaction and fellowship went a long way in furthering the solid reputation enjoyed by IMAs at AFRL Hanscom relative to the ESC commander and his staff.

Promotion Ceremony for Major Bret Kreh, VSBYH

LtCol Teresa O'Donnell, the IMA to the AFRL Det-3 Commander and Senior Site Reservist at AFRL Hanscom Research Site, enlisted the aid of Lt William Friedrich and A1C James Walls from the Det-3 Squadron Orderly Section, to prepare and execute a promotion ceremony for Major Bret Kreh, an AFRL Hanscom IMA in VSBYH. Shown here is Major Kreh, being pinned on by Col (S) John Wissler, the Hanscom Research Site

Commander, and Dr. John Schummers, section chief of Spectral Surveillance Technologies.

Sensors Directorate (AFRL/SN)

Data Link Expert

Maj Richard Bell, an IMA and Senior Technical Advisor assigned to the Sensors Directorate Aerospace Components and Subsystems Division served as the division's technical lead for data link technology. In that capacity, he brought together MITRE Corp global broadcast system experts with the AFRL/SN Common Operating Picture Project team to provide the team with critical projections of bandwidth capabilities in different environments. In support of the Low Cost Miniature Data Link (LCMDL) – an advanced data link for missiles and expendable UAV's – Maj Bell consulted with Raytheon and the AF Dual Use Science & Technology Program by identifying missing user inputs and other operations-related gaps in requirements planning.

ELINT

LtCol (S) Charles Berdanier, an IMA and Advanced Receiver Design Leader assigned to the Sensors Directorate Aerospace Components and Subsystems Division, led a design team in developing a low cost, disposable PC-based ELINT receiver prototype for use in SEAD on UAV's. Additionally, he performed an investigation of the limiting factors for integrating an RF mixer into a wafer-scale receiver

RF Phase Front Development

Maj Robert Bonneau, an IMA and Program Manager in the Radar Signal Processing Branch of the Sensors Directorate, is leading the development of realtime optical processing of radiofrequency (RF) phase fronts. RF radar and communications suffer due to RF components that have limited capacity (bandwidth) and poor phase stability. Additionally, digital processing of such broadband systems requires large computational power. Maj Bonneau is pursuing a solution that converts broadband RF to optical, which possesses high phase stability and permits wideband array performance (a capability not achievable with conventional analog components). When realized, this technology will provide significant performance improvements for RF/electro-optical sensors and communication applications.

Pocket Sized DNA Detector for Field Use

LtCol (S) Michael Estes, an IMA assigned to the Sensors Directorate, led the development of components for a pocket-size DNA synthesizer for in-field detection / identification of biological agents. Specifically, LtCol (S) Estes developed a technique of integrating aluminum gallium nitride-based UV light emitting diodes into multi-channel microfluidic cells in a manner that properly illuminates temperature-sensitive DNA, while restricting heating of the DNA and preventing UV crosstalk between cells. His elegant approach eliminated bulky and expensive UV mirrors and lenses that were required previously in such devices, which resulted in a 100-fold reduction in size and a 50-fold reduction in cost.

Cleaning up Test Data

Maj Robert Fetner, an IMA assigned to the Electro-Optical Combat Identification Technology Branch of the Sensors Directorate, resolved a critical problem with the Ground Electro-Optical (GEO) Laboratory, which was experiencing contamination of its micro-vibrometry field test data. Investigation by Maj Fetner using tri-axial accelerometers revealed disturbances transmitted through the trailer floor, from which he was able to isolate the test bench by locating flexo-elastic dampeners at strategic locations on the trailer and under the bench.

Antenna Design

Maj Brian Fischer, an IMA and Division Lead Reservist for the RF Sensor Division of the Sensors Directorate, developed an elegant mathematical approach to determining sensor placement to resolve linear phase interferometer ambiguity. The technique substitutes traditional approaches with a more rigorous mathematical method that executes faster and provides more design insight. Additionally, Maj Fischer generalized a design approach he developed for multi-arm spiral antennas for application to any multi-mode antenna arrangement. The former approach is immediately available for application to the Multi-Int Sensors for Persistent ISR Advanced Technology Demonstration, while the latter awaits hardware-in-the loop demonstration.

Hyperspectral Database Developed

LtCol Robert Mack, an IMA, Strategic Planner for Airborne Reconnaissance Technology assigned to the Sensors Directorate and expert in hyperspectral imaging, has built a database documenting hyperspectral programs of DOD, DOE and other federal government organizations. Additionally, he has met with other AFRL directorates as well as NAIC to acquire detailed information regarding their hyperspectral imaging research, analysis products and other activities. When incorporated into the hyperspectral program database, the database will serve as a powerful tool supporting strategic planning of the Directorate's hyperspectral research.

GPS Anti-Jam Testing

Maj Robert Moyle, an IMA and Advanced Navigation Technical Manager in the RF Sensor Division of the Sensor Directorate, led the setup of the GPS Virtual Flight Test Simulator and hardware-in-the-loop performance evaluation for analysis of F-15 GPS anti-jam technologies against known in-theater jammers used by Iraqi forces. The evaluation was crucial in determining optimal aircraft equipment configurations to assure GPS signal integrity and insure mission-critical GPS positioning data are available to the warfighter.

Threat Planning

LtCol Luis Pineiro-Aponte, an IMA in the Sensors Directorate, coordinated the collection of physical and interface data from various Systems Program Offices, then, using his air vehicle systems integration expertise, consulted with planners and program reviews of the Advanced Threat Alert and Response receiver / Lightweight Module Support Jammer. His efforts have resulted in more accurate and complete sets of requirements for these programs in addressing the needs of the Air Combat Command.

Cleaning up ULOs

LtCol Fred Roberts, Division Lead Reservist for the Financial Management, and Integrations & Operations Divisions of the Sensors Directorate, identified and resolved Directorate unliquidated obligations (ULO's) related to FY97 and FY98. He cleared 94% of the FY97 ULO's resulting in a cost savings / avoidance to the Government of \$2.5 million. He began work on FY98 ULO's, to-date identifying 87 accounting lines having \$900 thousand potential liability and has cleared about one-third of the lines and 20% of the liability. Additionally, LtCol Roberts has review 180 Directorate contracts that were closed over the past 9 months, and identified and cleared \$200 thousand of disconnects between local and DoD accounting systems.

Division Lead Reservists

Col Steven Schlasner, Senior IMA for the Sensors Directorate, developed and implemented a management concept within the Directorate reserve program termed, "Division Lead Reservist." This concept assigns select IMA's the additional duty of serving as the senior reserve advisor to their division and principal mentor to the, typically, 3 to 8 reservists assigned to that division – serving a similar function for the division that a Senior IMA serves for the directorate. This duty should provide more timely advice to division leadership, improved communication to the Senior IMA concerning the division, improved mentoring for division IMA's, and a leadership development opportunity for those serving as Division Lead Reservists.

Capt Dennis Shoulders (Aaron Linn, SNZW) –

Capt Dennis Shoulders, an IMA and Deputy Program Manager for the Lightweight Modular Support Jammer Critical Experiment (LMSJCE) assigned to the Sensor Applications and Demonstrations Division of the Sensors Directorate, performed various duties related to the LMSJCE. These included advocating funding for new jammer commonality across ACC platforms (\$3.5 million of additional funding was approved), performed a study that verified compatibility of LMSJ with external data systems, and coordinated with the China Lake Naval Weapons Test Center to piggy-back a critical LSMJ component onto existing flight tests.

B-2 Radar Signature Data

Maj Christopher Thomas, an IMA and Radar Signature Program Manager assigned to the Signature Division of the Sensors Directorate, led a deployment to Whiteman AFB to collect, process and analyze radar signature data on B-2 aircraft. Using one-of-a-kind instruments developed by the Signature Technology Office, Maj Thomas was responsible for target preparation, data collection, reduction and, analysis. Additionally, Maj Thomas compiled data from 17 benchmark targets and performed analyses that provided a standard for current radar signature prediction and measurement capabilities, which, consequently, will serve as a key input into the design and development of low-observable vehicles.